**WHAT IS CLAIMED IS:**

1. An autostereoscopic optical apparatus for viewing a stereoscopic virtual image comprising a left image to be viewed by an observer at a left viewing pupil and a right image to be viewed by the observer at a right viewing pupil, the apparatus comprising:

(a) a left image generation system for forming a left curved intermediate image comprising:

(i) a left curved mirror having a left mirror center of curvature;

(ii) a left beamsplitter disposed between a vertex of said left curved mirror and said left mirror center of curvature;

(iii) a left image source for providing light to said left curved mirror, said left curved mirror cooperating with said left beamsplitter to form a left intermediate image of said left image source, said left intermediate image having a left image center of curvature;

(iv) a left ball lens segment, centered about said left image center of curvature, for forming said left curved intermediate image from said left intermediate image of said left image source;

(b) a right image generation system for forming a right curved intermediate image comprising:

(i) a right curved mirror having a right mirror center of curvature;

(ii) a right beamsplitter disposed between a vertex of said right curved mirror and said right mirror center of curvature;

(iii) a right image source for providing light to said right curved mirror, said right curved mirror cooperating with said right beamsplitter to form a right intermediate

image of said right image source, said right intermediate image having a right image center of curvature;

(iv) a right ball lens segment, centered about said right image center of curvature, for forming said right curved intermediate image from said right intermediate image of said right image source;

(c) a ball lens imaging curved mirror having a focal surface and having a center of curvature, said center of curvature placed substantially optically midway between said left ball lens segment and said right ball lens segment, wherein said left curved intermediate image from said left image generation system and said right curved intermediate image from said right image generations system lie substantially on said focal surface;

(d) a third beamsplitter disposed between said focal surface and said center of curvature of said ball lens imaging curved mirror, said ball lens imaging curved mirror and said third beamsplitter cooperating to form, at the left viewing pupil:

(i) a real image of said left ball lens segment; and

(ii) a virtual image of said left curved intermediate image;

said ball lens imaging curved mirror and said third beamsplitter further cooperating to form, at the right viewing pupil:

(i) a real image of said right ball lens segment; and

(ii) a virtual image of said right curved intermediate image.

2. An autostereoscopic optical apparatus according to claim 1 further comprising a left corrector element disposed near the center of curvature of said left curved mirror.

3. An autostereoscopic optical apparatus according to claim 2 wherein said left corrector element comprises an aspheric surface.

4. An autostereoscopic optical apparatus according to claim 2 wherein said left corrector element comprises a compound lens.

5. An autostereoscopic optical apparatus according to claim 1 wherein said left beamsplitter is cross sectionally wedge-shaped.

6. An autostereoscopic optical apparatus according to claim 1 wherein said left beamsplitter is a pellicle.

7. An autostereoscopic optical apparatus according to claim 1 wherein said left image source is taken from the group consisting of a CRT, an emissive array, an LCD display, an OLED.

8. An autostereoscopic optical apparatus according to claim 1 further comprising a field lens disposed between said left mirror center of curvature and the focal point of said left curved mirror for imaging said left mirror center of curvature toward said left image center of curvature.

9. An autostereoscopic optical apparatus according to claim 8 wherein a surface of said field lens is substantially concentric with said left mirror center of curvature.

10. An autostereoscopic optical apparatus according to claim 8 wherein a surface of said field lens is substantially concentric with said left image center of curvature.

11. An autostereoscopic optical apparatus according to claim 1 further comprising a focusing optical element adjacent to said left image source for directing light toward said left mirror center of curvature.

12. An autostereoscopic optical apparatus according to claim 11 wherein said focusing optical element is taken from the group consisting of a

Fresnel lens, a holographic optical element, a diffraction optical element, and a lens.

13. An autostereoscopic optical apparatus according to claim 1 wherein said left ball lens segment comprises a hemispheric lens with a reflective surface.

14. An autostereoscopic optical apparatus according to claim 1 wherein said left ball lens segment comprises at least one meniscus lens segment.

15. An autostereoscopic optical apparatus for viewing a stereoscopic virtual image comprising a left image to be viewed by an observer at a left viewing pupil and a right image to be viewed by the observer at a right viewing pupil, the apparatus comprising:

(a) a left image generation system and a right image generation system, each image generation system comprising:

(i) an image generation curved mirror having a mirror center of curvature;

(ii) an image generation beamsplitter disposed between the vertex of said image generation curved mirror and said mirror center of curvature;

(iii) an image source for directing image-bearing light toward said image generation curved mirror;

said image generation curved mirror cooperating with said image generation beamsplitter to form an intermediate image of said image source, said intermediate image having an image center of curvature;

(iv) a field lens disposed near said intermediate image for imaging said mirror center of curvature toward said image center of curvature; and

(v) a ball lens segment, centered about said image center of curvature, for forming a curved image from said intermediate image;

said left image generation forming a left curved image and said right image generation system forming a right curved image thereby;

(b) a pupil imaging curved mirror having a focal surface and having a pupil imaging center of curvature, said pupil imaging center of curvature disposed substantially optically midway between said ball lens segment for said left image generation system and said ball lens segment for said right image generation system; and

(c) a third beamsplitter disposed between said focal surface and said pupil imaging center of curvature, said pupil imaging spherical mirror and said third beamsplitter cooperating to form a real image of said ball lens segment for said left image generation system at the left viewing pupil and to form a real image of said ball lens segment for said right image generation system at the right viewing pupil.

16. An autostereoscopic optical apparatus according to claim 15 wherein at least one of said left or said right image generation systems further comprise a corrector element disposed near the center of curvature of said image generation curved mirror.

17. An autostereoscopic optical apparatus according to claim 16 wherein said corrector element comprises an aspheric surface.

18. An autostereoscopic optical apparatus according to claim 16 wherein said corrector element comprises a compound lens.

19. An autostereoscopic optical apparatus according to claim 15 wherein said image generation beamsplitter is cross sectionally wedge-shaped.

20. An autostereoscopic optical apparatus according to claim 15 wherein said image generation beamsplitter is a pellicle.

21. An autostereoscopic optical apparatus according to claim 15 wherein said image source is taken from the group consisting of a CRT, an emissive array, an LCD display, an OLED.

22. An autostereoscopic optical apparatus according to claim 15 wherein a surface of said field lens is substantially concentric with said mirror center of curvature.

23. An autostereoscopic optical apparatus according to claim 15 wherein a surface of said field lens is substantially concentric with said mirror center of curvature.

24. An autostereoscopic optical apparatus according to claim 15 further comprising a focusing optical element adjacent to said image source for directing light toward said mirror center of curvature.

25. An autostereoscopic optical apparatus according to claim 24 wherein said focusing optical element is taken from the group consisting of a Fresnel lens, a holographic optical element, a diffraction optical element, and a lens.

26. An autostereoscopic optical apparatus according to claim 15 wherein said ball lens segment comprises a hemispheric lens with a reflective surface.

27. An autostereoscopic optical apparatus according to claim 15 wherein said ball lens segment comprises at least one meniscus lens segment.

28. An autostereoscopic optical apparatus for viewing a stereoscopic virtual image comprising a left image to be viewed by an observer at a left viewing pupil and a right image to be viewed by the observer at a right viewing pupil, the apparatus comprising:

(a) a left image generation system and a right image generation system, each image generation system comprising:

(i) an image generation curved mirror having a mirror center of curvature;

(ii) an image generation beamsplitter disposed between the vertex of said image generation curved mirror and said mirror center of curvature;

(iii) an image source for directing image-bearing light toward said image generation curved mirror,

said image generation curved mirror cooperating with said image generation beamsplitter to form an intermediate image of said image source, said intermediate image having an image center of curvature; and

(iv) a ball lens segment, centered about said image center of curvature, for forming a curved image from said intermediate image;

said left image generation forming a left curved image and said right image generation system forming a right curved image thereby;

(b) a pupil imaging curved mirror having a focal surface and having a pupil imaging center of curvature, said pupil imaging center of curvature disposed substantially optically midway between said ball lens segment for said left image generation system and said ball lens segment for said right image generation system; and

(c) a third beamsplitter disposed between said focal surface and said pupil imaging center of curvature, said pupil imaging spherical mirror and said third beamsplitter cooperating to form a real image of said ball lens segment for said left image generation system at the left viewing pupil and to form a real image of said ball lens segment for said right image generation system at the right viewing pupil.

29. An autostereoscopic optical apparatus according to claim 28 wherein at least one of said left image generation system and a right image generation systems further comprises a field lens, disposed near said intermediate

image formed by said image generation beamsplitter and said image generation curved mirror, for imaging said mirror center of curvature toward said image center of curvature.

30. An autostereoscopic optical apparatus according to claim 28 wherein at least one of said left or said right image generation systems further comprise a corrector element disposed near the center of curvature of said image generation curved mirror.

31. An autostereoscopic optical apparatus according to claim 30 wherein said corrector element comprises an aspheric surface.

32. An autostereoscopic optical apparatus according to claim 30 wherein said corrector element comprises a compound lens.

33. An autostereoscopic optical apparatus according to claim 28 wherein said image generation beamsplitter is cross sectionally wedge-shaped.

34. An autostereoscopic optical apparatus according to claim 28 wherein said image generation beamsplitter is a pellicle.

35. An autostereoscopic optical apparatus according to claim 28 wherein said image source is taken from the group consisting of a CRT, an emissive array, an LCD display, an OLED.

36. An autostereoscopic optical apparatus according to claim 29 wherein a surface of said field lens is substantially concentric with said mirror center of curvature.

37. An autostereoscopic optical apparatus according to claim 29 wherein a surface of said field lens is substantially concentric with said mirror center of curvature.

38. An autostereoscopic optical apparatus according to claim 28 further comprising a focusing optical element adjacent to said image source for directing light toward said mirror center of curvature.

39. An autostereoscopic optical apparatus according to claim 38 wherein said focusing optical element is taken from the group consisting of a Fresnel lens, a holographic optical element, a diffraction optical element, and a lens.

40. An autostereoscopic optical apparatus according to claim 28 wherein said ball lens segment comprises a hemispheric lens with a reflective surface.

41. An autostereoscopic optical apparatus according to claim 28 wherein said ball lens segment comprises at least one meniscus lens segment.

42. An autostereoscopic optical apparatus for viewing a stereoscopic virtual image comprising a left image to be viewed by an observer at a left viewing pupil and a right image to be viewed by the observer at a right viewing pupil, the apparatus comprising:

(a) a left image generation system for forming a left curved intermediate image comprising:

(i) a left curved mirror having a left mirror center of curvature;

(ii) a left beamsplitter disposed between the vertex of said left curved mirror and said left mirror center of curvature;

(iii) a left image source for providing light from the left image to said left curved mirror, said left curved mirror cooperating with said left beamsplitter to form a left intermediate image of said left image source, said left

intermediate image having a left image center of curvature;

(iv) a left ball lens segment, centered about said left image center of curvature, for forming said left curved intermediate image from said left intermediate image of said left image source;

(b) a right image generation system for forming a right curved intermediate image comprising:

(i) a right curved mirror having a right mirror center of curvature;

(ii) a right beamsplitter disposed between the vertex of said right curved mirror and said right mirror center of curvature;

(iii) a right image source for providing light from the right image to said right curved mirror, said right curved mirror cooperating with said right beamsplitter to form a right intermediate image of said right image source, said right intermediate image having a right image center of curvature;

(iv) a right ball lens segment, centered about said right image center of curvature, for forming said right curved intermediate image from said right intermediate image of said right image source;

(c) a left ball lens imaging curved mirror having a left focal surface and having a left ball lens imaging center of curvature, wherein said left curved intermediate image from said left image generation system lies substantially on said left focal surface;

(d) a right ball lens imaging curved mirror having a right focal surface and having a right ball lens imaging center of curvature, wherein said right curved intermediate image from said right image generation system lies substantially on said right focal surface;

(e) a third beamsplitter disposed at a position along the optical path between said left focal surface and said left ball lens center of curvature and between said right focal surface and said right ball lens center of curvature;

said third beamsplitter cooperating with said left ball lens imaging curved mirror to form, at the left viewing pupil:

(i) a real image of said left ball lens segment; and,

(ii) a virtual image of said left curved intermediate image;

said third beamsplitter further cooperating with said right ball lens imaging curved mirror to form, at the right viewing pupil:

(i) a real image of said right ball lens segment; and

(ii) a virtual image of said right curved intermediate image.

43. An autostereoscopic optical apparatus according to claim 42 further comprising a left corrector element disposed near the center of curvature of said left curved mirror.

44. An autostereoscopic optical apparatus according to claim 43 wherein said left corrector element comprises an aspheric surface.

45. An autostereoscopic optical apparatus according to claim 43 wherein said left corrector element comprises a compound lens.

46. An autostereoscopic optical apparatus according to claim 42 wherein said left beamsplitter is cross sectionally wedge-shaped.

47. An autostereoscopic optical apparatus according to claim 42 wherein said left beamsplitter is a pellicle.

48. An autostereoscopic optical apparatus according to claim 42 wherein said left image source is taken from the group consisting of a CRT, an emissive array, an LCD display, an OLED.

49. An autostereoscopic optical apparatus according to claim 42 further comprising a field lens disposed between said left mirror center of curvature and the focal point of said left curved mirror for imaging said left mirror center of curvature toward said left image center of curvature.

50. An autostereoscopic optical apparatus according to claim 49 wherein a surface of said field lens is substantially concentric with said left mirror center of curvature.

51. An autostereoscopic optical apparatus according to claim 49 wherein a surface of said field lens is substantially concentric with said left image center of curvature.

52. An autostereoscopic optical apparatus according to claim 42 further comprising a focusing optical element adjacent to said left image source for directing light toward said left mirror center of curvature.

53. An autostereoscopic optical apparatus according to claim 52 wherein said focusing optical element is taken from the group consisting of a Fresnel lens, a holographic optical element, a diffraction optical element, and a lens.

54. An autostereoscopic optical apparatus according to claim 42 wherein said left ball lens segment comprises a hemispheric lens with a reflective surface.

55. An autostereoscopic optical apparatus according to claim 45 wherein said left ball lens segment comprises at least one meniscus lens segment.

56. An autostereoscopic optical apparatus for viewing a stereoscopic virtual image comprising a left image to be viewed by an observer at a left viewing pupil and a right image to be viewed by the observer at a right viewing pupil, the apparatus comprising:

(a) a left image generation system and a right image generation system, each image generation system comprising:

(i) an image generation curved mirror having a mirror center of curvature;

(ii) an image generation beamsplitter disposed between the vertex of said image generation curved mirror and said mirror center of curvature;

(iii) an image source for directing image-bearing light toward said image generation curved mirror;

said image generation curved mirror cooperating with said image generation beamsplitter to form an intermediate image of said image source, said intermediate image having an image center of curvature;

(iv) a field lens disposed near said intermediate image for imaging said mirror center of curvature toward said image center of curvature; and,

(v) a ball lens segment, centered about said image center of curvature, for forming a curved image from said intermediate image;

said left image generation forming a left curved image and said right image generation system forming a right curved image thereby;

(b) a left pupil imaging curved mirror having a left focal surface and having a left pupil imaging center of curvature, said ball lens segment for said left image generation system centered about said left pupil imaging center of curvature;

(c) a right pupil imaging curved mirror having a right focal surface and having a right pupil imaging center of curvature, said ball lens segment for said right image generation system centered about said right pupil imaging center of curvature;

(d) a third beamsplitter disposed at a position along the optical path between said left focal surface and said left pupil imaging center of curvature and between said right focal surface and said right pupil imaging center of curvature;

said third beamsplitter cooperating with said left pupil imaging curved mirror to form, at the left viewing pupil:

(i) a real image of said ball lens segment for said left image generation system; and

(ii) a virtual image of said left curved image;

said third beamsplitter further cooperating with said right pupil imaging curved mirror to form, at the right viewing pupil:

(i) a real image of said right ball lens segment for said right image generation system; and

(ii) a virtual image of said right curved image.

57. An autostereoscopic optical apparatus according to claim 56 wherein at least one of said left or said right image generation systems further comprise a corrector element disposed near the center of curvature of said image generation curved mirror.

58. An autostereoscopic optical apparatus according to claim 57 wherein said corrector element comprises an aspheric surface.

59. An autostereoscopic optical apparatus according to claim 57 wherein said corrector element comprises a compound lens.

60. An autostereoscopic optical apparatus according to claim 56 wherein said image generation beamsplitter is cross sectionally wedge-shaped.

61. An autostereoscopic optical apparatus according to claim 56 wherein said image generation beamsplitter is a pellicle.

62. An autostereoscopic optical apparatus according to claim 56 wherein said image source is taken from the group consisting of a CRT, an emissive array, an LCD display, an OLED.

63. An autostereoscopic optical apparatus according to claim 56 wherein a surface of said field lens is substantially concentric with said mirror center of curvature.

64. An autostereoscopic optical apparatus according to claim 56 wherein a surface of said field lens is substantially concentric with said mirror center of curvature.

65. An autostereoscopic optical apparatus according to claim 56 further comprising a focusing optical element adjacent to said image source for directing light toward said mirror center of curvature.

66. An autostereoscopic optical apparatus according to claim 65 wherein said focusing optical element is taken from the group consisting of a Fresnel lens, a holographic optical element, a diffraction optical element, and a lens.

67. An autostereoscopic optical apparatus according to claim 56 wherein said ball lens segment comprises a hemispheric lens with a reflective surface.

68. An autostereoscopic optical apparatus according to claim 56 wherein said ball lens segment comprises at least one meniscus lens segment.

69. A method for forming an autostereoscopic virtual image comprising a left image to be viewed by an observer at a left viewing pupil and a right image to be viewed by the observer at a right viewing pupil, the method comprising:

(a) forming a left curved intermediate image by:

(i) providing a left curved mirror having a left mirror center of curvature;

(ii) disposing a left beamsplitter between the vertex of said left curved mirror and said left mirror center of curvature;

(iii) forming a left intermediate image having a left image center of curvature by directing image-bearing light from a left image source through said left beamsplitter to said left curved mirror;

(iv) forming said left curved intermediate image from said left intermediate image of said left image source through a left ball lens segment, centered about said left image center of curvature;

(b) forming a right curved intermediate image by:

(i) providing a right curved mirror having a right mirror center of curvature;

(ii) disposing a right beamsplitter between the vertex of said right curved mirror and said right mirror center of curvature;

(iii) forming a right intermediate image having a right image center of curvature by directing image-bearing light from a right image source through said right beamsplitter to said right curved mirror;

(iv) forming said right curved intermediate image from said right intermediate image of said right image source through a right ball lens segment, centered about said right image center of curvature;

(c) providing a ball lens imaging curved mirror having a focal surface and having a center of curvature, said center of curvature placed substantially optically midway between said left ball lens segment and said right ball lens segment, wherein said left curved intermediate image from said left image generation system and said right curved intermediate image from said right image generation system lie substantially on said focal surface;

(d) disposing a third beamsplitter between said focal surface and said center of curvature of said ball lens imaging curved mirror, said ball lens imaging curved mirror and said third beamsplitter cooperating to form, at the left viewing pupil:

(i) a real image of said left ball lens segment; and

(ii) a virtual image of said left curved intermediate image;

said ball lens imaging curved mirror and said third beamsplitter further cooperating to form, at the right viewing pupil:

(i) a real image of said right ball lens segment; and

(ii) a virtual image of said right curved intermediate image.

70. A method for forming an autostereoscopic virtual image according to claim 69 further comprising the step of directing light through an optical corrector element near the center of curvature of said left curved mirror.

71. A method for forming an autostereoscopic virtual image according to claim 69 wherein the step of forming said left intermediate image comprises the step of energizing a CRT.

72. A method for forming an autostereoscopic virtual image according to claim 69 wherein the step of forming said left intermediate image comprises the step of energizing an emissive array.

73. A method for forming an autostereoscopic virtual image according to claim 69 wherein the step of forming said left intermediate image comprises the step of energizing an LCD.

74. A method for forming an autostereoscopic virtual image according to claim 69 wherein the step of forming said left intermediate image comprises the step of energizing an OLED.

75. A method for forming an autostereoscopic virtual image according to claim 69 further comprising the step of imaging said left mirror center of curvature toward said left image center of curvature through a field lens.

76. A method for forming an autostereoscopic virtual image according to claim 69 wherein the step of forming a left intermediate image comprises the step of directing said image-bearing light from said left image source toward said left mirror center of curvature.

77. A method for forming an autostereoscopic virtual image according to claim 69 wherein the step of forming said left curved intermediate image comprises the step of using an hemispheric lens with a reflective surface.

78. A method for forming an autostereoscopic virtual image comprising a left image to be viewed by an observer at a left viewing pupil and a right image to be viewed by the observer at a right viewing pupil, the method comprising:

(a) forming a left curved intermediate image by:

(i) providing a left curved mirror having a left mirror center of curvature;

(ii) disposing a left beamsplitter between the vertex of said left curved mirror and said left mirror center of curvature;

(iii) forming a left intermediate image having a left image center of curvature by directing image-bearing light from a left image source through said left beamsplitter to said left curved mirror;

(iv) forming said left curved intermediate image from said left intermediate image of said left image source through a left ball lens segment, centered about said left image center of curvature;

(b) forming a right curved intermediate image by:

(i) providing a right curved mirror having a right mirror center of curvature;

(ii) disposing a right beamsplitter between the vertex of said right curved mirror and said right mirror center of curvature;

(iii) forming a right intermediate image having a right image center of curvature by directing image-bearing light from a right image source through said right beamsplitter to said right curved mirror;

(iv) forming said right curved intermediate image from said right intermediate image of said right image source through a right ball lens segment, centered about said right image center of curvature;

(c) providing a left ball lens imaging curved mirror having a left focal surface and having a left ball lens imaging center of curvature, wherein said left curved intermediate image from said left image generation system lies substantially on said left focal surface;

(d) providing a right ball lens imaging curved mirror having a right focal surface and having a right ball lens imaging center of curvature, wherein said right curved intermediate image from said right image generation system lies substantially on said right focal surface;

(e) disposing a third beamsplitter at a position along the optical path between said left focal surface and said left ball lens center of

curvature and between said right focal surface and said right ball lens center of curvature;

said third beamsplitter cooperating with said left ball lens imaging curved mirror to form, at the left viewing pupil:

(i) a real image of said left ball lens segment; and

(ii) a virtual image of said left curved intermediate image;

said third beamsplitter further cooperating with said right ball lens imaging curved mirror to form, at the right viewing pupil:

(i) a real image of said right ball lens segment; and

(ii) a virtual image of said right curved intermediate image.

79. A method for forming an autostereoscopic virtual image according to claim 78 further comprising the step of directing light through an optical corrector element near the center of curvature of said left curved mirror.

80. A method for forming an autostereoscopic virtual image according to claim 78 wherein the step of forming said left intermediate image comprises the step of energizing a CRT.

81. A method for forming an autostereoscopic virtual image according to claim 78 wherein the step of forming said left intermediate image comprises the step of energizing an emissive array.

82. A method for forming an autostereoscopic virtual image according to claim 78 wherein the step of forming said left intermediate image comprises the step of energizing an LCD.

83. A method for forming an autostereoscopic virtual image according to claim 78 wherein the step of forming said left intermediate image comprises the step of energizing an OLED.

84. A method for forming an autostereoscopic virtual image according to claim 78 further comprising the step of imaging said left mirror center of curvature toward said left image center of curvature through a field lens.

85. A method for forming an autostereoscopic virtual image according to claim 78 wherein the step of forming a left intermediate image comprises the step of directing said image-bearing light from said left image source toward said left mirror center of curvature.

86. A method for forming an autostereoscopic virtual image according to claim 78 wherein the step of forming said left curved intermediate image comprises the step of using an hemispheric lens with a reflective surface.